United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

March 4, 2005

Colonel Robert M. Carpenter
District Engineer
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Log No.:	4-1-04-F-9180
Corps Application No.:	199403952 (IP-MN)
Dated:	August 23, 2002
Project:	Sanibel and Captiva Islands Beach Renourishment
Applicant:	Captiva Erosion Prevention District
County:	Lee

Dear Colonel Carpenter:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed Sanibel and Captiva Islands Beach Renourishment Project located in Lee County, Florida, and its effects on the threatened loggerhead sea turtle (*Caretta caretta*), endangered green sea turtle (*Chelonia mydas*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered West Indian manatee (*Trichechus manatus*), threatened piping plover (*Charadrius melodus*), and threatened bald eagle (*Haliaeetus leucocephalus*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 et seq.) and the Fish and Wildlife Coordination Act of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*).

This biological opinion is based on information provided from the U.S. Army Corps of Engineers' (Corps) Public Notice dated August 23, 2002; the applicant's agent, Coastal Planning and Engineering (CPE); the Florida Department of Environmental Protection (DEP), Bureau of Beaches and Coastal Systems; the Florida Fish and Wildlife Conservation Commission (FWC); telephone conversations and email correspondence with the Corps and CPE, field investigations, and other sources of information. A complete administrative record of this consultation is on file at the South Florida Ecological Services Office, Vero Beach, Florida.

In the August 23, 2002, Public Notice, the Corps determined the proposed project "may affect, but is not likely to adversely affect" the endangered West Indian manatee. Since the Corps has agreed to include the *Standard Manatee Construction Conditions* as protection measures in the Federal permit, the Service concurs with the Corps' determination.

In an email dated October 26, 2004, the Corps determined the proposed project "may affect, but is not likely to adversely affect" the threatened bald eagle because construction activities in the vicinity of Blind Pass may occur during the nesting season and a portion of the project footprint is within 750 feet of bald eagle nest LE-O22B. Designated construction beach access routes are located outside the bald eagle primary protection zone. To retain the potential for water exchange between Clam Bayou and the Gulf, the applicant has proposed to avoid construction between R-114 and R-115, which encompasses approximately 1,000 of the approximately 1,500 feet of the project area that over-laps the eagle protection zone. The applicant states sand placement activities will not occur during the critical first 12 weeks of the nesting season (October through December) when nest abandonment, due to disturbance, is most likely to occur. Based on this information, the Service concurs with the Corps' determination. However, the Service has recently received information that bald eagle nest LE-022B was destroyed during Hurricane Charley on August 13, 2004. Suitable replacement nest trees in the project area were also destroyed. Therefore, the project will not affect the bald eagle.

In the aforementioned email, the Corps also determined the proposed project "may affect, but is not likely to adversely affect" the threatened piping plover. Since the applicant has agreed to implement a shorebird monitoring and protection plan approved by the FWC and DEP, the Service concurs with the Corps' determination. This plan is described below.

Fish and Wildlife Resources

Shorebirds

In addition to sea turtles, the shoreline of Sanibel and Captiva Islands supports suitable habitat for several species of nesting, migratory, and resident shorebirds. The Sanibel-Captiva Conservation Foundation (SCCF) has implemented a comprehensive shorebird monitoring and protection program on Sanibel and Captiva Islands. Monitoring typically commences in February and extends until August or September when the last nests are abandoned. The following four shorebird species were known to historically nest on Sanibel Island: the least tern (*Sterna antillarum*); snowy plover (*Charadrius alexandrinus*); Wilson's plover (*Charadrius wilsonia*); and black skimmer (*Rynchops nigra*). Between 1993 and 2001, a small nesting colony of black skimmers was documented as nesting on Sanibel Island. But for reasons that are unclear, black skimmer nesting has not occurred over the past two years. Prior to 2001, a small shorebird colony was documented as consistently nesting in the dunes landward of the nourishment area on Sanibel Island to the west of Silver Key, but it appears the site has been abandoned. Table 1 presents the number of nesting pairs of each species found during monitoring by the SCCF on Sanibel Island in 2002 and 2003.

Table 1. Number of shorebird nests on Sanibel Island during 2002 and 2003 (DEP 2004).

Species	2002	2003
Least tern	50	50
Snowy plover	27	31
Wilson's plover	6	
Black skimmer	0	

Shorebird nesting is not known to have occurred within or immediately adjacent to the proposed nourishment project locations for the past 3 years. Though, a nesting colony of approximately 15 pairs of least terns and 7 pairs of snowy plovers was recently documented approximately 1,200 feet east from the project footprint on Sanibel Island (R-118).

A Shorebird Management Plan was developed by the City of Sanibel in coordination with the Sanibel-Captiva Conservation Foundation to minimize and avoid potential impacts before, during, and after construction of the proposed project. The Corps and DEP permits will include specific conditions for the protection of nesting shorebird species during project construction. Daily surveys will be required between February 1 and September 1 throughout the construction period. Surveys will be performed by biologists and trained volunteers using accepted and appropriate ecological survey procedures. The applicant has agreed to include buffer zones in any location where shorebirds have been engaged in courtship or nesting behavior, or around areas where piping plovers occur.

Hardbottom Reef Habitat

According to the DEP's Consolidated Notice of Intent to Issue for the Captiva and Sanibel Island Nourishment Project, File number 0200269-001-JC, dated September 13, 2004, neither natural hardbottom habitat or seagrass communities are present within the sand placement area. During resource surveys of the proposed pipeline corridors and the sand stock-pile area, several hardbottom patches and formations were found in the vicinity of R-88 and R-105. Investigations in May 2004 by CPE, found six hardbottom patches in the vicinity of R-88 which were comprised primarily of shell hash with some cyanobacterial coverage and spiny paper cockles (*Papyridea soleniformis*). Approximately 500 feet offshore of R-105, an area with natural hardbottom substrate was found among the sand and shell hash in water with depths of 26 to 28 feet. The substrate is colonized by various encrusting sponges, fire coral (*Millepora* sp.), barnacles, and gorgonians (*Leptogoriga virgulata*).

Since the hardbottom areas are located at least 500 feet from the proposed project area, significant impacts, as a result of direct burial or sedimentation, are not anticipated. If the sand stockpile area is utilized, the applicant has agreed to conduct pre-, during, and post-monitoring to determine if the hardbottom areas were adversely impacted. The details of the monitoring requirements and mitigation requirements, if necessary, are outlined in the DEP's Consolidated Notice of Intent to Issue for the proposed project as referenced above.

The Service supports the proposed shorebird and hardbottom habitat monitoring plans.

CONSULTATION HISTORY

On March 9, 1995, the Corps published Public Notice number 199403952 (IP-MN) for the nourishment of a 3,900-foot section of the Sanibel Island shoreline. The Corps determined the construction activities related to the proposed project "may affect" listed sea turtles.

On September 5, 1995, the Service provided the Corps with our Biological Opinion, Service Log Number 4-1-95-F-304, for the proposed project. The project was constructed in 1996.

In the Corps' Public Notice dated July 9, 1999, the applicant proposed to dredge Blind Pass and place approximately 78,500 cubic yards (cy) of beach compatible material along 3,000 feet of Sanibel Island shoreline between DEP monuments R-115 and R-118. The Corps determined the proposed project "may affect" listed sea turtles and the West Indian manatee.

On September 17, 1999, the Service provided a letter (Service Log Number 4-1-99-I-541) to the Corps requesting additional information and recommending the Corps initiate formal consultation under Section 7 of the ESA for potential adverse affects of the action on listed sea turtles and the manatee.

During formal consultation with the Corps, the applicant reduced the amount of dredged material to be placed on the beach, proposed to remove exotic vegetation from the sea turtle nesting beach, and revised the project description. The applicant agreed to conduct sand placement activities outside of the sea turtle nesting season, but the material would be truck-hauled to the project site. However, the identified route occurred within the secondary zone of bald eagle nest LE-022B. The Corps determined the project "was not likely to adversely affect the bald eagle." The applicant agreed to implement a bald eagle protection plan as recommended by the Service. Since the applicant agreed to implement the *Standard Manatee Construction Conditions* during construction, the Corps revised their 1999 "may affect" determination to "may affect, not likely to adversely affect" for the manatee.

In a letter dated October 3, 2000, the Service concluded consultation and concurred with the Corps "may affect, not likely to adversely affect" for listed sea turtles, West Indian manatee, and the bald eagle based on the above information.

In the Public Notice dated August 23, 2003, the Corps stated the applicant requested a 50-year permit to implement a long-term beach renourishment program along the shoreline of Sanibel and Captiva Islands between DEP monuments R-84 and R-109. The renourishment events are proposed to occur during the sea turtle nesting season. The Corps determined the construction activities related to the proposed project "may affect" listed sea turtles and "but are not likely to adversely affect" the West Indian manatee.

In a letter to the Corps dated January 13, 2003, the Service indicated the proposed project is located in the primary and secondary zone of bald eagle nest LE-022B and piping plovers are known to occur in the project area. The Service requested the Corps provide a determination for bald eagles and piping plovers, as well as requested additional information necessary to concur with the Corps' determination for sea turtles, bald eagles, and piping plovers.

In an email dated October 26, 2004, the Corps determined the proposed project "is not likely to affect" the bald eagle, piping plover or its critical habitat. Based on this information and that construction activities will not occur between October and December, the Service concurs with the Corps' determination. However, the nest and nest tree were destroyed by Hurricane Charley in August 2004. Therefore, the project will not affect the bald eagle.

In a letter dated December 22, 2004, a request to modify the proposed project was submitted to the Corps and DEP by the applicant's consultant as a result of beach erosion in the project area caused by Hurricane Charley, which was further exacerbated by the passage of Hurricanes Ivan, Frances, and Jeanne in 2004. The modification includes the restoration of beaches of Sanibel and Captiva Islands with the Federal Emergency Management Agency (FEMA) Category G funds between R-83 and R-118. FEMA initiated consultation with the Service regarding this and other projects in a letter dated December 10, 2004. Since the action will be authorized by the Corps, the FEMA funded portion of the project is included in this biological opinion.

In accordance with the ESA, the Service is providing the following biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Proposed Action

The Corps has received an application for a 50-year permit to renourish the beaches of Captiva Island and Sanibel Island with periodic renourishment every 7 to 9 years. The applicant proposes to place approximately 1.4 million cy of material along 4.8 miles of Captiva Island between DEP monument R-83 and R-109 and 200,000 cy of material along 1.2 miles of Sanibel Island between R-110 and R-118. Fill will not be placed along the 900-foot segment of beach between R-114 and R-115, which includes the historic location of Blind Pass (Clam Bayou temporary drainage channel). The constructed beach will include a berm height of plus 7.0 feet National Geodetic Vertical Datum (NGVD) at the dune line to plus 5.0 feet NGVD at the crest of the seaward edge of the beach face and a seaward slope of 1 Vertical:12 Horizontal to the existing profile. Though the applicant has proposed to limit construction activities outside the sea turtle nesting season, sand placement activities may occur during the sea turtle nesting season, March through November.

Several borrow areas were identified in the vicinity of the project area that contained sufficient volumes of beach compatible sand for the current project, as well as, at least six future renourishment events over the 50-year period of the Corps permit. Two of the borrow areas (III-A and III-B) were permitted for the 1996 beach nourishment project. Borrow area III-A is located 5.5 miles offshore of north Sanibel Island with grain sizes that are 0.39 mm with a 2.3 percent silt content. Borrow area III-B is located 6.5 miles offshore of north Sanibel Island with a grain size of 0.38 mm and 4.04 mm percent silt content. These two sites still contain 2.1 million cubic yards of sand for renourishment. Four additional sites (IV, V, VI, and VII) have been located. Borrow area IV is located 8.4 miles offshore of the center of Captiva Island and has a grain size of 0.38 with a silt content of 3.89 percent and carbonate ranges from 42 to 62 percent. This area has 1.62 million cubic yards of sand available. Borrow area VI is located

8.3 miles offshore of the center of Captiva Island and has a grain size of 0.40 mm with a silt content of 1.69 percent and carbonate ranges from 42 to 53 percent. Borrow areas V and VII have 2.38 and 6.04 million cubic yards of sand available with similar grain size composites, silt content, and carbonate ranges as borrow areas IV and VI. Placement of sand on the beach may occur within sea turtle nesting season.

The proposed project also includes the rehabilitation and extension of the existing groin at Redfish Pass. The groin would be rehabilitated and extended 100 feet seaward to mitigate the effects of the swash channel and reduce sand losses into Redfish Pass. The groin rehabilitation and extension activities would likely take place during sea turtle nesting season.

The project is located in the Gulf of Mexico and in Sections 15, 22, 26, 27, and 35, Township 45 South, Range 21 East; and Sections 2, 3, 11, 13, and 14, Township 46 South, Range 21 East, Sanibel and Captiva Islands, Lee County, Florida.

Table 2. Summary of native beach sand and Proposed Borrow Areas for Captiva and Sanibel Island. Adapted from CPE's submittal to the Service dated May 2003.

OFFSHORE BORROW AREA CHARACTERISTICS
CAPTIVA AND SANIBEL ISLANDS RENOURISHMENT PROJECT

BORROW AREA		VOLUME (c.y.)	MEAN GRAIN SIZE (mm)	MEAN GRAIN SIZE (phi)	SORTING (phi)	SILT (%)
III-A		1,410,000	0.39	1.36	1.33	2.03
III-B		723,000	0.38	1.38	1.08	4.04
IV		1,620,000	0.38	1.38	1.52	3.89
V	RESERVE[1]	2,380,000	0.37	1.43	1.32	2.44
VI		9,970,000	0.40	1.33	1.26	1.69
VII	RESERVE[1]	6,040,000	0.36	1.48	1.17	1.64
TOTAL		22,143,000				
NATIVE BEACH - CAPTIVA			0.35	1.52	1.76	2.44
NATIVE BEACH - SANIBEL (R112) (NOVEMBER 2001)			0.38	1.39	1.90	2.21

1. RESERVE: Additional investigation required.

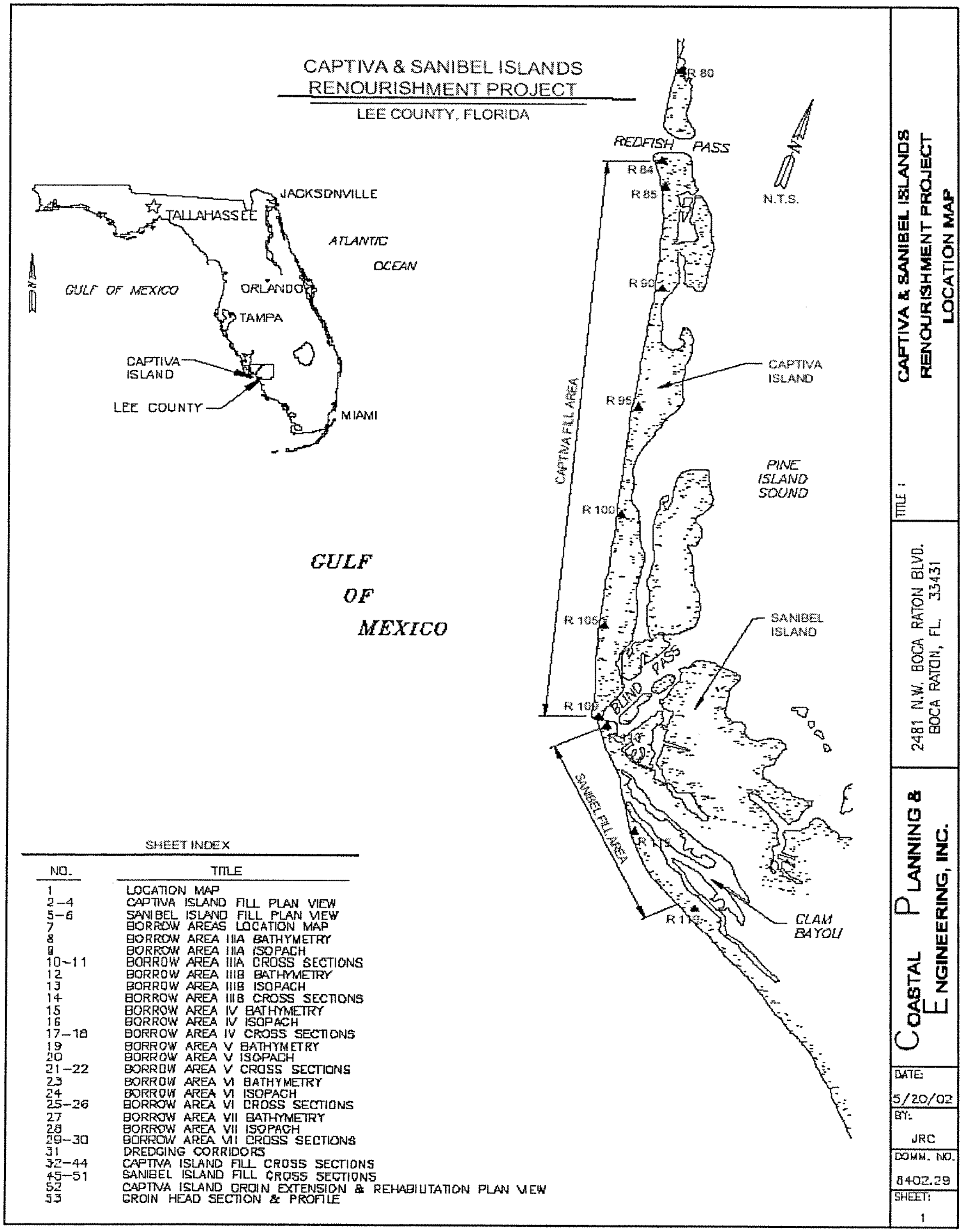

Figure 1. Project location (CPE 2003)

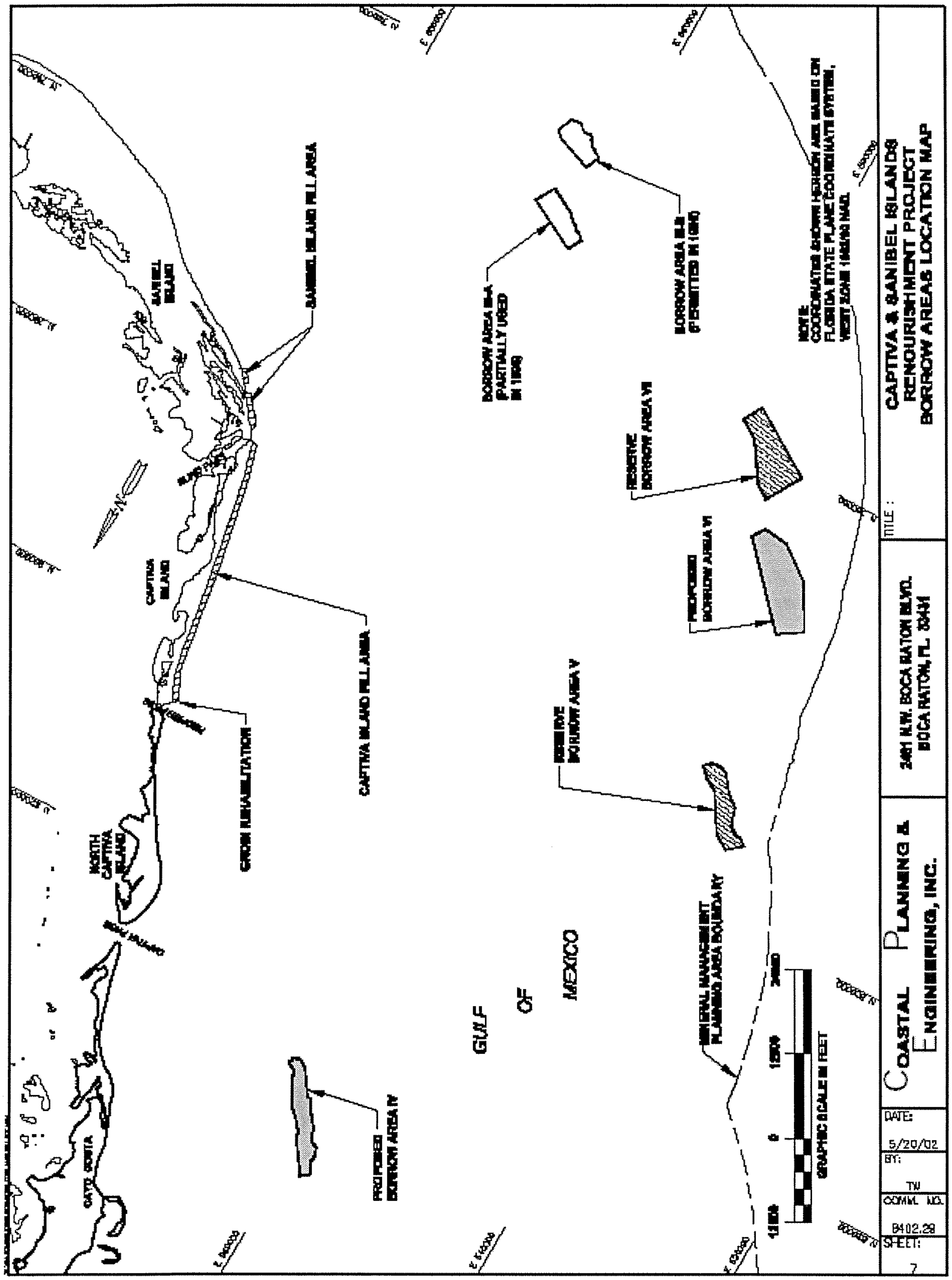

Figure 2. Borrow site locations relative to the project area (CPE 2003)

Action area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The Service has determined the action area for this project includes 4.8 miles of Captiva Island between DEP monuments R-83 and R-109 and 1.2 miles of Sanibel Island between monuments R-110 and R-118, excluding the 900-foot section of beach between R-114 and R-115.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle, listed as a threatened species on July 28, 1978, (43 FR 32800) inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental United States (U.S.) from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson 1984).

No critical habitat has been designated for the loggerhead sea turtle.

Green Sea Turtle

The green sea turtle was federally listed as a protected species on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green sea turtle has a worldwide distribution in tropical and subtropical waters. Major green sea turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green sea turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (NOAA Fisheries and Service 1991a). Nesting has also been documented along the Gulf coast of Florida on Santa Rosa Island (Okaloosa and Escambia Counties) and from Pinellas County through Collier County (Florida FWC statewide nesting database). Green sea turtles have been known to nest in Georgia, but only on rare occasions (Georgia Department of Natural Resources statewide nesting database). The green turtle also nests sporadically in North Carolina and South Carolina (North Carolina Wildlife Resources Commission statewide nesting database 2005). Unconfirmed nesting of green sea turtles in Alabama has also been reported according to unpublished Bon Secour National Wildlife Refuge nesting reports.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys.

Leatherback Sea Turtle

The leatherback sea turtle, was listed as an endangered species on June 2, 1970, (35 FR 8491) and nests on shores of the Atlantic, Pacific, and Indian Oceans. Non-breeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Nesting grounds are distributed worldwide, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (NOAA Fisheries and Service 1992; National Research Council 1990).

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (NOAA Fisheries and Service 1992). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (North Carolina Wildlife Resources Commission 2005; and Georgia Department of Natural Resources statewide nesting databases). Leatherback nesting has also been reported on the northwest coast of Florida (LeBuff 1990; FWC statewide nesting database); a false crawl (non-nesting emergence) has been observed on Sanibel Island (LeBuff 1990).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of Saint Croix, U.S. Virgin Islands.

Life history

Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert et al. 1980; Richardson and Richardson 1982; Lenarz et al. 1981, among others); the mean is approximately 4.1 (Murphy and Hopkins 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd 1988). Mean clutch size varies from about 100 to 126 along the southeastern U.S. coast (NOAA Fisheries and Service 1991b). Nesting migration intervals of 2 to 3 years are most common in loggerheads, but the number can vary from 1 to 7 years (Dodd 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group 1998).

Green Sea Turtle

Green sea turtles deposit from 1 to 9 clutches within a nesting season, but the average is about 3.3. The interval between nesting events within a season varies around a mean of about 13 days (Hirth 1997). Mean clutch size varies widely among populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Only occasionally do females produce clutches in successive years. Usually 2, 3, 4, or more years intervene between breeding seasons (NOAA Fisheries and Service 1991a). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1997).

Leatherback Sea Turtle

Leatherbacks nest an average of 5 to 7 times within a nesting season, with an observed maximum of 11 (NOAA Fisheries and Service 1992). The interval between nesting events within a season is about 9 to 10 days. Clutch size averages 80 to 85 yolked eggs, with the addition of usually a few dozen smaller, yolkless eggs, mostly laid toward the end of the clutch (Pritchard 1992). Nesting migration intervals of 2 to 3 years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, Saint Croix, U.S. Virgin Islands (McDonald and Dutton 1996). Leatherbacks are believed to reach sexual maturity in 6 to 10 years (Zug and Parham 1996).

Population dynamics

Loggerhead Sea Turtle

Total estimated nesting in the Southeast is approximately 68,000 to 90,000 nests per year, according to the FWC statewide nesting database 2002, Georgia Department of Natural Resources statewide nesting database 2002, South Carolina Department of Natural Resources statewide nesting database 2002, and the North Carolina Wildlife Resources Commission statewide nesting database 2002. In 1998, there were over 80,000 nests in Florida alone. From a global perspective, the southeastern U.S. nesting aggregation is of paramount importance to the survival of the species and is second in size only to that which nests on islands in the Arabian Sea off Oman (Ross 1982; Ehrhart 1989; NOAA Fisheries and Service 1991b). The status of the Oman colony has not been evaluated recently (Meylan et al. 1995). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NOAA Fisheries and Service 1991b). About 80 percent of loggerhead nesting in the southeastern U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties) (NOAA Fisheries and Service 1991b).

Green Sea Turtle

About 150 to 2,750 females are estimated to nest on beaches in the continental U.S. annually (FWC 2004). In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year (NOAA Fisheries and Service 1998). Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green sea turtle nesting aggregation in the world occurs on Raine Island, Australia, where thousands of females nest nightly in an average nesting season (Limpus et al. 1993). In the Indian Ocean, major nesting beaches occur in Oman where 30,000 females are reported to nest annually (Ross and Barwani 1995).

Leatherback Sea Turtle

Recent estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually (Spotila et al. 1996). The largest nesting populations at present occur in the western

Atlantic in French Guiana (4,500 to 7,500 females nesting per year), Colombia (an estimated several thousand nests annually), and in the western Pacific in West Papua (formerly Irian Jaya) and Indonesia (about 600 to 650 females nesting per year). In the U.S., small nesting populations occur on the Florida east coast (100 females per year) (FWC 2004), Sandy Point, U.S. Virgin Islands (50 to 190 females per year) (Alexander et al. 2002), and Puerto Rico (30 to 90 per year).

Status and distribution

Loggerhead Sea Turtle

Genetic research involving analysis of mitochondrial DNA has identified five different loggerhead subpopulations/nesting aggregations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina to around Cape Canaveral, Florida (about 29° North.); (2) South Florida Subpopulation occurring from about 29° North on Florida's east coast to Sarasota on Florida's west coast; (3) Dry Tortugas, Florida, Subpopulation, (4) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (5) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen 1994; 1995; Bowen et al. 1993; Encalada et al. 1998; Pearce 2001). These data indicate gene flow between these five regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting subpopulation. The Northern Subpopulation has declined substantially since the early 1970s, but most of that decline occurred prior to 1979. No significant trend has been detected in recent years (Turtle Expert Working Group 1998, 2000). Adult loggerheads of the South Florida Subpopulation have shown significant increases over the last 25 years, indicating the population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 2002. Nesting surveys in the Dry Tortugas, Northwest Florida, and Yucatán Subpopulations have been too irregular to date, to allow for a meaningful trend analysis (Turtle Expert Working Group 1998 and 2000).

Threats include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is particular concern about the extensive incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

Green Sea Turtle

Total population estimates for the green sea turtle are unavailable, and trends based on nesting data are difficult to assess because of large annual fluctuations in numbers of nesting females. For instance, in Florida, where the majority of green sea turtle nesting in the southeastern U.S. occurs, estimates range from 150 to 2,750 females nesting annually (FWC 2004). Populations in Surinam, and Tortuguero, Costa Rica, may be stable, but there is insufficient data for other areas to confirm a trend.

A major factor contributing to the green sea turtle's decline worldwide is commercial harvest for eggs and food. Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor and has seriously impacted green sea turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction, and turtles with heavy tumor burdens may die. Other threats include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations.

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65 percent of the worldwide population), is now less than 1 percent of its estimated size in 1980. Spotila et al. (1996) recently estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila et al. (1996) determined leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded leatherbacks are on the road to extinction and further population declines can be expected unless we take action to reduce adult mortality and increase survival of eggs and hatchlings.

The crash of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include: loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

Analysis of the Species/Critical Habitat Likely to be Affected

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities, and behavior modification of nesting females due to escarpment formation within the project area during a nesting season resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs. The quality of the placed sand could affect the ability of female turtles to nest, the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest.

Critical habitat has not been designated in the continental U.S.; therefore, the proposed action would not result in an adverse modification.

ENVIRONMENTAL BASELINE

The distribution of sea turtle nesting activity on Florida's Southwest Gulf Coast (Sarasota, Charlotte, Lee, and Collier Counties) is understood less than that of the East Coast epicenter of sea turtle nesting between Brevard and Palm Beach Counties (Addison *et al.* 2000). Ten to 12 percent of the total nesting activity on Florida's beaches occurs on Florida's Gulf Coast (Addison et al. 2000). During the 1993 to 2003 nesting seasons, Lee County accounted for approximately 12 percent of the overall nesting in the southern Gulf coast region. During the 2003 nesting season, of the 46.2 miles of Lee County shoreline surveyed, data showed a total of 768 loggerhead sea turtle and green sea turtle emergences (301 nests and 467 false crawls) according to the FWC's Statewide Sea Turtle Nesting Survey Data, 2004. Though leatherback sea turtles nest occasionally on Florida's southwest coast, leatherback nests have not been recorded in Lee County between 1993 and 2003. The Lee County shoreline supports the third greatest number of nesting turtles in southwest Florida (FWC, unpublished data). Since 1993, an average of 40.9 miles of Lee County shoreline has been surveyed annually for sea turtle nesting activity (Table 3).

Status of the Species within the Action Area

Between 2001 and 2003, the number of sea turtle nests deposited on Captiva and Sanibel Islands ranged from a low of 287 nests in 2002 to a high of 321 nests in 2003. Table 3 provides sea turtle nesting habitat on Captiva and Sanibel Islands from 2001 through 2003. The data was collected by the Sanibel-Captiva Conservation Foundation as part of the FWC's Statewide Nesting Beach Survey Program within the project area during the main portion of sea turtle nesting season (May through October).

Table 3: FWC Statewide Nesting Beach Survey Data from 1993 to 2002 in Lee County, Florida.

Year	Loggerhead nests	Loggerhead False-crawls	Total	Green nests	Green False-crawls	Total	Total Turtle nests	Total false-crawls	Total
2003	301	467	768	3	0	3	304	467	771
2002	560	596	1156	7	7	14	567	603	1170
2001	660	730	1390	6	12	18	666	742	1408
2000	935	1026	1961	5	2	7	940	1028	1968
1999	851	774	1625	2	8	10	853	782	1635
1998	865	931	1796	1	0	1	866	931	1797
1997	594	677	1271	0	1	1	594	678	1272
1996	686	899	1585	0	1	1	686	900	1586
1995	700	997	1697	3	1	4	703	998	1791
1994	691	656	1347	4	1	5	695	657	1352
1993	487	544	1031	0	0	0	487	544	1031
Total	7,330	8,297	15,627	31	33	64	7,361	8,330	15,781

Table 4: Sea turtle nesting data for Sanibel-Captiva Islands, specifically Captiva Island, North Captiva Island, Sanibel East and Sanibel West as identified in the FWC Statewide Nesting Beach Survey Program.

Year	Loggerhead Sea Turtles		Green Sea Turtles		Leatherback Sea turtles	
	Nests	False Crawls	Nest	False Crawls	Nests	False Crawls
2003	320	409	1	0	0	0
2002	285	382	2	7	0	0
2001	305	429	2	10	0	0
Total	910	1228	5	17	0	0

Loggerhead Sea Turtle

The loggerhead sea turtle nesting and hatching season for southern Gulf of Mexico beaches (includes Pinellas through Monroe Counties in Florida) extends from April 1 through November 30. Incubation ranges from about 45 to 95 days.

Green Sea Turtle

The green sea turtle nesting and hatching season for southern Gulf of Mexico beaches (includes Pinellas through Monroe Counties in Florida) extends from May 15 through October 31. Incubation ranges from about 45 to 75 days.

Leatherback Sea Turtle

Longboat Key in Sarasota County was the first documented leatherback nesting event along the central west coast shoreline of Florida. The nest was deposited on May 31, 2001. Incubation ranges from about 55 to 75 days.

Factors Affecting the Species Habitat within the Action Area

The Sanibel and Captiva Islands are barrier islands approximately 10 miles long and 1 mile across at the widest point. The islands lie approximately 3 miles from the mainland. The area is characterized as a high-density residential and resort area, which is bounded by Ding Darling National Wildlife Refuge on the eastern side of islands.

Contiguous montypical stands of Australian pine (*Casuarina sp.*) are common along the beaches of Sanibel and Captiva Islands. The presence of Australian pines or snags on the beach reduce access to nesting areas and reduce the suitability of nesting habitat. During construction of the proposed project, all Australian pines will be removed from the fill area

EFFECTS OF THE ACTION

Factors to be Considered

The proposed sand placement activities are expected to occur along 6 miles of suitable sea turtle nesting habitat and construction will likely take place during the sea turtle nesting season.

Analyses for Effects of the Action

Beneficial Effects

The placement of sand on a beach with reduced dry fore-dune habitat may increase sea turtle nesting habitat if the placed sand is highly compatible (*i.e.*, grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project. In addition, a nourished beach that is designed and constructed to mimic a natural beach system may be more stable than the eroding one it replaces, thereby benefiting sea turtles.

Direct Effects

Placement of sand on a beach in and of itself may not provide suitable nesting habitat for sea turtles. Although beach nourishment may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Nourishment during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program would reduce these impacts, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, and/or tides) or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

Potential adverse impacts during the project construction phase include disturbance of existing nests, which may have been missed, disturbance of females attempting to nest, and disorientation of emerging hatchlings. Heavy equipment will be required to rehabilitate and extend the existing groin and this equipment will have to traverse the sandy beach to the project site, which could result in harm to nesting females, nests, and emerging hatchlings. Since a large trench will be excavated on the beach and be present during the night for some portion of the construction, a potential threat to nesting females and emerging hatchlings will exist.

Following construction, the presence of groins has the potential to impact sea turtles in several ways. They may interfere with nesting turtle access to the beach, result in a change in beach profile and width (downdrift erosion, loss of sandy berms, and escarpment formation), trap hatchlings, and concentrate predators.

1. Nest relocation

Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged by their movement, particularly if eggs are not relocated within 12 hours of deposition (Limpus et al. 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus et al. 1979; Ackerman 1980; Parmenter 1980; Spotila et al. 1983; McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard et al. 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard et al. 1985), hatchling size (Packard et al. 1981; McGehee 1990), energy reserves in the yolk at hatching (Packard et al. 1988), and locomotory ability of hatchlings (Miller et al. 1987).

In a 1994 Florida study comparing loggerhead hatching and emergence success of relocated nests with *in situ* nests, Moody (1998) found hatching success was lower in relocated nests at 9 of 12 beaches evaluated and emergence success was lower in relocated nests at 10 of 12 beaches surveyed in 1993 and 1994.

2. Equipment

The placement of pipelines, groin materials, and the use of heavy machinery on the beach during a construction project may also have adverse effects on sea turtles. They can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure. The equipment and materials can also create impediments to hatchling sea turtles as they crawl to the ocean.

3. Artificial lighting

Visual cues are the primary sea-finding mechanism for hatchling sea turtles (Mrosovsky and Carr 1967; Mrosovsky and Shettleworth 1968; Dickerson and Nelson 1989; and Witherington and Bjorndal 1991). When artificial lighting is present on or near the beach, it can misdirect hatchlings once they emerge from their nests and prevent them from reaching the ocean (Philibosian 1976; Mann 1977; and FWC sea turtle disorientation database). In addition, a significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, misdirect females trying to return to the surf after a nesting event, and misdirect emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on dredging barges may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes also attracted to the barge lights. This impact could be reduced by using the minimum amount of light necessary (may require shielding) or low pressure sodium lighting during project construction.

4. Predator concentration

The presence of groins has the potential to attract and concentrate predatory fishes, resulting in higher probabilities of hatchling predation as hatchlings enter the ocean.

Indirect Effects

Many of the direct effects of beach nourishment may persist over time and become indirect impacts. These indirect effects include increased susceptibility of relocated nests to catastrophic events, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, the formation of escarpments, and future sand migration.

1. Increased susceptibility to catastrophic events

Nest relocation may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn 1998; Wyneken et al. 1998).

2. Increased beachfront development

Pilkey and Dixon (1996) state beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Dean (1999) also notes the very existence of a beach nourishment project can encourage more development in coastal areas. Following completion of a beach nourishment project in Miami in 1982, investment in new and updated facilities substantially increased tourism there (National Research Council 1995). Increased building density immediately adjacent to the beach often resulted as older buildings were replaced by much larger ones that accommodated more beach users. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (National Research Council 1990), and can also result in greater adverse effects due to artificial lighting, as discussed above.

3. Changes in the physical environment

Beach nourishment may result in changes in sand density (compaction), beach shear resistance (hardness), beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson 1987, Nelson 1988).

Beach compaction and unnatural beach profiles that may result from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand and/or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson et al. 1987; Nelson and Dickerson 1988a). Significant reductions in nesting success (*i.e.*, false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer 1980; Raymond 1984; Nelson and Dickerson 1987; Nelson et al. 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson 1988c). Nelson and Dickerson (1988b) concluded, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more.

These impacts can be minimized by using suitable sand and by tilling compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed a tilled nourished beach will remain uncompacted for up to 1 year. Therefore, the Service requires multi-year beach compaction monitoring and, if necessary, tilling to ensure project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

4. Escarpment formation

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984 and Nelson et al. 1987). Escarpments may develop in the groin vicinity as the beaches equilibrate to their final positions. These escarpments can hamper or prevent access to nesting sites (Nelson and Blihovde 1998). Researchers have shown female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (*e.g.*, in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

5. Downdrift erosion

Groins, in conjunction with beach nourishment, can help stabilize U.S. East Coast barrier island beaches (Leonard *et al.* 1990). However, groins often result in accelerated beach erosion downdrift of the structures (Komar 1983; National Research Council 1987) and corresponding degradation of suitable sea turtle nesting habitat (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a, 1991b, 1992). Impacts first are noted and greatest changes are observed close to the structures, but effects eventually may extend great distances along the coast (Komar 1983). Beach nourishment only partly alleviates impacts of groin construction on downdrift beaches (Komar 1983).

Groins operate by blocking the natural littoral drift of sand (Kaufman and Pilkey 1979; Komar 1983). Once sand fills the updrift groin area, some littoral drift and sand deposition on adjacent downdrift beaches occurs due to spillover. However, groins often force the river of sand into deeper offshore water, and sand that previously would have been deposited on downdrift beaches is lost from the system (Kaufman and Pilkey 1979).

6. Groin breakdown

As the groin structures fail and break apart, they spread debris on the beach, which may further impede nesting females from accessing suitable nesting sites (resulting in a higher incidence of false crawls) and trap hatchlings and nesting turtles.

Species Response to a Proposed Action

Ernest and Martin (1999) conducted a comprehensive study to assess the effects of beach nourishment on loggerhead sea turtle nesting and reproductive success. Their findings suggest a significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on control or prenourished beaches. This reduction in nesting success was most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the nourishment project (*e.g.,* beach profile, sediment grain size, beach compaction, frequency, and extent of escarpments). During the first post-construction year, the time required for turtles to excavate an egg chamber on the untilled, hard-packed sands of one treatment area increased significantly relative to control and background conditions. However, in another treatment area, tilling was effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second post-construction year, digging times returned to background levels.

During the first post-construction year, nests on the nourished beaches were deposited significantly farther from both the toe of the dune and the tide line than nests on control beaches. Furthermore, nests were distributed throughout all available habitat and were not clustered near the dune as they were in the control. As the width of nourished beaches decreased during the second year, among-treatment differences in nest placement diminished. More nests were washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped beaches of the control. This phenomenon persisted through the second post-construction year monitoring and resulted from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occurred as the beach equilibrated to a more natural contour.

Ernest and Martin (1999) found the principal effect of nourishment on sea turtle reproduction was a reduction in nesting success during the first year following project construction, as with other beach nourishment projects. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin indicate changes in beach profile may be more important. Regardless, as a nourished beach is reworked by natural processes in subsequent years and adjusts from an unnatural construction profile to a more natural beach profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches.

Once the groin improvements are complete, the Service does not anticipate an increase of adverse affects to sea turtles beyond the current level currently experienced in the groin vicinity.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. The Service is not aware of any cumulative effects in the project area.

CONCLUSION

After reviewing the current status of the federally threatened loggerhead sea turtle, endangered green sea turtle, and endangered leatherback sea turtle, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion the project, as proposed, is not likely to jeopardize the continued existence of the federally threatened loggerhead sea turtle, endangered green sea turtle, and endangered leatherback sea turtle, and is not likely to destroy or adversely modify designated critical habitat. No critical habitat has been designated for the federally threatened loggerhead sea turtle, endangered green sea turtle, and endangered leatherback sea turtle in the continental U.S.; therefore, none will be affected.

The proposed project will affect 6 miles of beach proposed for nourishment, including the groin refurbishment area, of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern U.S. Research has shown the principal effect of beach nourishment on sea turtle reproduction is a reduction in nesting success, and this reduction is most often limited to the first year following project construction. Research has also shown that the impacts of a nourishment project on sea turtle nesting habitat are typically short-term because a nourished beach will be reworked by natural processes in subsequent years, and beach compaction and the frequency of escarpment formation will decline. Although a variety of factors, including some that cannot be controlled, can influence how a nourishment project or a groin will perform from an engineering perspective, measures can be implemented to minimize impacts to sea turtles.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the Corps so they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

The Service anticipates 6 miles of nesting beach habitat could be taken as a result of this proposed action. The take is expected to be in the form of: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) destruction of all nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (5) misdirection of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) harassment in the form of disturbing or interfering with female turtles attempting to nest within the groin construction area or on adjacent beaches as a result of construction activities; (7) behavior modification of nesting females or hatchlings due to the presence of the groins which may act as barriers to movement; (8) behavior modification of nesting females if they dig into shallowly buried groins, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs (9) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (10) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service.

Incidental take is anticipated for only the 6 miles of beach that has been identified for sand placement or improvement of the existing groin. The Service anticipates incidental take of sea turtles will be difficult to detect for the following reasons: (1) the turtles nest primarily at night and all nests are not found because [a] natural factors, such as rainfall, wind, and tides may obscure crawls and [b] human-caused factors, such as pedestrian and vehicular traffic, may obscure crawls and result in nests being destroyed because they were missed during a nesting survey and egg relocation program; (2) the total number of hatchlings per undiscovered nest is unknown; (3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown; (4) an unknown number of females may avoid the project beach and be forced to nest in a less than optimal area; (5) lights may misdirect an unknown number of hatchlings and cause death; and (6) escarpments may form and cause an unknown number of females from accessing a suitable nesting site. However, the level of take of these species can be anticipated by the disturbance and renourishment of suitable turtle nesting beach habitat because: (1) turtles nest within the project site; (2) beach renourishment and groin refurbishment activities will likely occur during a portion of the nesting season; (3) the renourishment project will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will deter and/or misdirect nesting females and hatchlings.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to the species. Critical habitat has not been designated in the project area; therefore, the project will not result in destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead and green sea turtles:

1. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence must be used on the project site;

2. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. If nests are constructed in the area of beach nourishment, the eggs must be relocated;

3. If the groin construction project will be conducted during the sea turtle nesting season, sea turtle protection measures must be employed to minimize the likelihood of take;

4. Immediately after completion of the beach nourishment and groin improvement project, and prior to the next 3 nesting seasons, beach compaction must be monitored and tilling must be conducted, as required, to reduce the likelihood of impacting sea turtle nesting and hatching activities;

5. Immediately after completion of the beach nourishment and groin improvement project, and prior to the next 3 nesting seasons, monitoring must be conducted to determine if escarpments are present and escarpments must be leveled, as required, to reduce the likelihood of impacting sea turtle nesting and hatching activities;

6. The applicant must ensure contractors conducting the beach nourishment and groin work fully understand the sea turtle protection measures detailed in this incidental take statement;

7. During the sea turtle nesting season, construction equipment and materials must be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable; and

8. During the sea turtle nesting season, lighting associated with the project must be minimized to reduce the possibility of disrupting and misdirecting nesting and/or hatchling sea turtles.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary:

1. All fill material placed, must be sand similar to a native beach in the vicinity of the site that has not been affected by prior renourishment activities. The fill material must be similar in both coloration and grain size distribution to the native beach. All such fill material must be

free of construction debris, rocks, or other foreign matter and must not contain, on average, greater than 10 percent fines (*i.e.*, silt and clay) (passing the #200 sieve) and must not contain, on average, greater than 5 percent coarse gravel or cobbles, exclusive of shell material (retained by the #4 sieve). This is exclusive of the proposed base layer sediment which is to be obtained from the identified borrow areas only;

2. Daily early morning surveys for sea turtle nests will be required if any portion of the beach nourishment project occurs during the period from April 1 through November 30. Nesting surveys must be initiated 65 days prior to nourishment activities or by April 1, whichever is later. Nesting surveys must continue through the end of the project or through September 30, whichever is earlier. If nests are constructed in areas where they may be affected by construction activities, eggs must be relocated per the following requirements:

   2a. Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nesting survey and egg relocation procedures. Surveyors must have a valid FWC permit. Nesting surveys must be conducted daily between sunrise and 9 a.m. Surveys must be performed in such a manner to ensure construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures;

   2b. Only those nests that may be affected by sand placement construction activities will be relocated. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Nest relocations in association with construction activities must cease when construction activities no longer threaten nests. Nests deposited within areas where construction activities have ceased or will not occur for 65 days must be marked and left in place unless other factors threaten the success of the nest. Any nests left in the active construction zone must be clearly marked, and all mechanical equipment must avoid nests by at least 10 feet; and

   2c. Nests deposited within the groin refurbishment site and access areas must be left in place and marked for avoidance unless other factors threaten the success of the nest (nest laid below debris line marking the typical high tide, erosion). The actual location of the clutch will be determined and nests will be marked. A circle with a radius of 10 feet, centered at the clutch (or the center of the disturbed area if the eggs cannot be located), will be marked by stake and survey tape or string. No construction activities will enter this circle and no adjacent construction will be allowed which might directly or indirectly disturb the area within the staked circle;

3. To the maximum extent practicable, all excavations and temporary alteration of beach topography will be filled or leveled to the natural beach profile prior to 9:00 p.m. each day. During any periods when excavated trenches must remain on the beach at night, nighttime sea turtle monitoring by the sea turtle permit holder will be required in the project area in order to further reduce possible impacts to nesting and hatchling sea turtles. Nighttime

monitors will record data on false crawls, successful nesting, and any additional activities of nesting or hatchling sea turtles in the project area;

4. If any nesting turtles are sighted on the beach during daylight hours, construction activities must cease immediately until the turtle has returned to the water, and the sea turtle permit holder responsible for nest monitoring has marked any nest that may have been laid for avoidance;

5. On-beach access to the groin construction site will be restricted to the wet sand below mean high water;

6. Immediately after completion of the proposed project and prior to April 1, for 3 subsequent years, sand compaction must be monitored in the area of restoration in accordance with a protocol agreed to by the Service, the State regulatory agency, and the applicant. At a minimum, the protocol provided under 6a and 6b below must be followed. If required, the area must be tilled to a depth of 24 inches and each pass of the tilling equipment must be overlapped to allow more thorough and even tilling. All tilling activity must be completed prior to April 1. If the project is completed during the nesting season, tilling will not be performed in areas where nests have been left in place or relocated. An annual summary of compaction surveys and the actions taken must be submitted to the Service. (NOTE: The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Also, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach):

   6a. Compaction sampling stations must be located at 500-foot intervals along the project area. One station must be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station must be midway between the dune line and the high water line (normal wrack line).

   At each station, the cone penetrometer will be pushed to a depth of 6, 12, and 18 inches, three times (three replicates). Material may be removed from the hole, if necessary, to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers. Replicates will be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final 6 averaged compaction values; and

   6b. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area must be tilled immediately prior to April 1. If values exceeding 500 psi are distributed throughout the project area, but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required;

7. Visual surveys for escarpments along the project area must be made immediately after completion of the beach nourishment and groin refurbishment project and prior to April 1 for 3 subsequent years. Escarpments that interfere with sea turtle nesting or exceed 18 inches in height for a distance of 100 feet must be leveled to the natural beach contour by April 1. If the project is completed during the sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization describing methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken must be submitted to the Service. (NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the beach);

8. The applicant must arrange a meeting between representatives of the contractor, the Service, the FWC, and the permitted person responsible for egg relocation at least 30 days prior to the commencement of work on this project. At least 10 days advance notice must be provided prior to conducting this meeting. This will provide an opportunity for explanation and/or clarification of the sea turtle protection measures;

9. From April 1 through November 30, staging areas for construction equipment must be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach must be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes must be off the beach to the maximum extent possible. Temporary storage of pipes on the beach must be in such a manner so as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage);

10. From April 1 through November 30, direct lighting of the beach and near shore waters must be limited to the immediate construction area and must comply with safety requirements. Lighting on offshore or onshore equipment must be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the waters surface and nesting beach while meeting all U.S. Coast Guard, EM 385-1-1, and Occupational Safety and Health Administration (OSHA) requirements. Light intensity of lighting plants must be reduced to the minimum standard required by OSHA for general construction areas, in order not to misdirect sea turtles. Shields must be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area (Figure 3, on the following page);

11. A report describing the actions taken to implement the terms and conditions of this incidental take statement must be submitted to the South Florida Ecological Services Office within 60 days of completion of the proposed work for each year when the activity has occurred. This report will include the dates of actual construction activities, names and qualifications of personnel involved in nest surveys and relocation activities, descriptions and locations of self-release beach sites, nest survey and relocation results, and hatching success of nests;

12. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project must be notified so the eggs can be moved to a suitable relocation site;

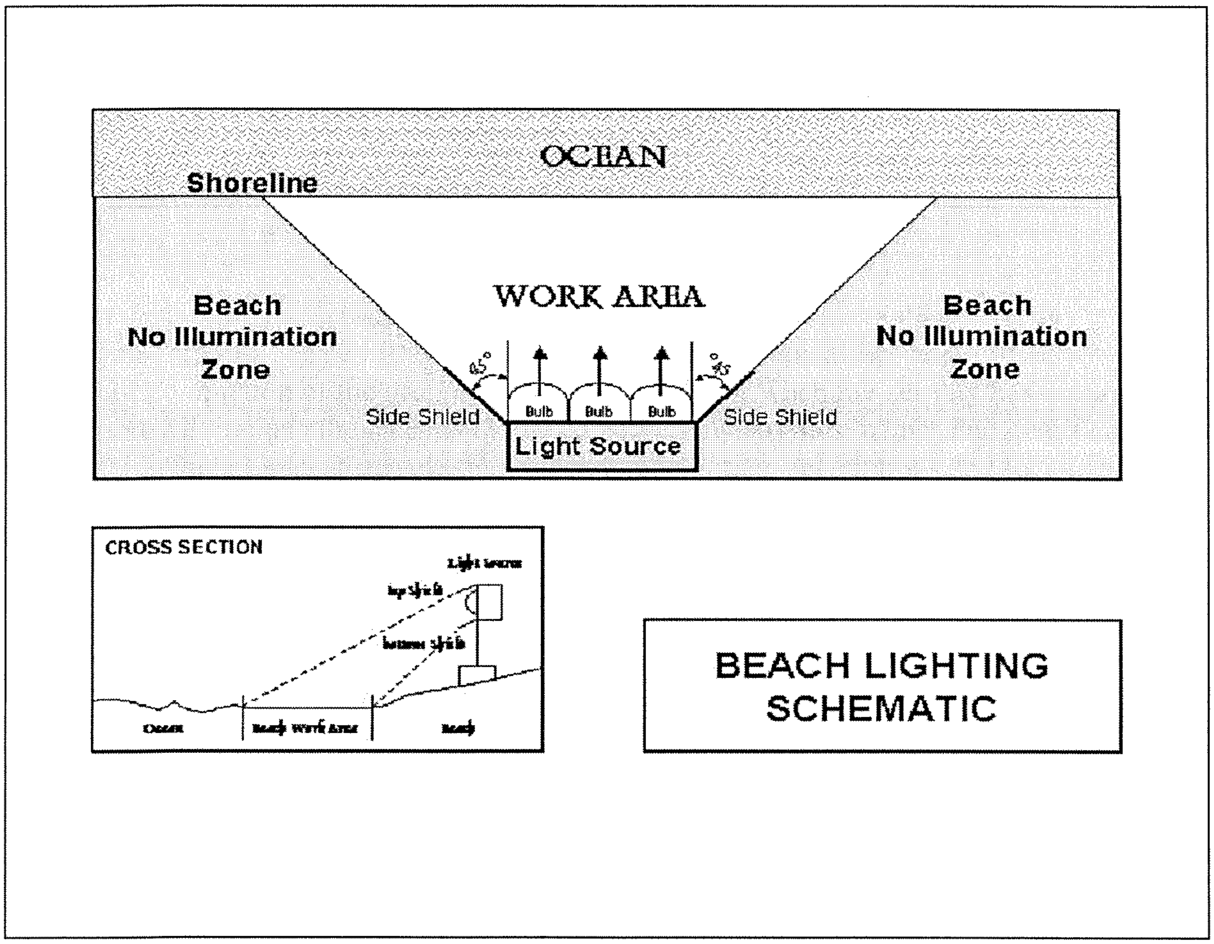

Figure 3. Beach Lighting Schematic.

13. Upon locating a sea turtle adult, hatchling, or egg harmed or destroyed as a direct or indirect result of the project, notification must be made to the FWC at Bureau of Marine Enforcement (formerly the Florida Marine Patrol) at 800-342-5367. Care should be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis;

14. In the event a groin structure fails or begins to disintegrate, all debris and structural material must be removed from the nesting beach area and deposited off-beach immediately. If maintenance of a groin structure is required during the period from April 1 to November 1, no work will be initiated without prior coordination with the South Florida Ecological Services Office in Vero Beach; and

15. The groin must be removed if it is determined to not be effective or to be causing a significant adverse impact to the beach and dune system.

The Service believes incidental take will be limited to the 6 miles of beach identified for sand placement. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes no more than the following types of incidental take will result from the proposed action: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) destruction of all nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities or groin presence; (5) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) behavior modification of nesting females or hatchlings due to the presence of the groins which may act as barriers to movement; (7) behavior modification of nesting females if they dig into shallowly buried groins, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; (8) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (9) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service. The amount or extent of incidental take for sea turtles will be considered exceeded if the project results in more than a **one-time placement** of sand on the 6 miles of beach identified for sand placement. If during the course of the action, this level of incidental take is exceeded; such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Construction activities for this project and similar future projects should be planned to take place outside the main part of the sea turtle nesting and hatching season.

2. Appropriate native salt-resistant dune vegetation should be established on the restored dunes. The DEP can provide technical assistance on the specifications for design and implementation.

3. Surveys for nesting success of sea turtles should be continued for a minimum of 3 years following beach nourishment to determine whether sea turtle nesting success has been adversely impacted.

4. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and/or the life history of sea turtle species that nest in the area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the reinitiation request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation and effort in protecting fish and wildlife resources. Should you have any questions regarding the findings and recommendations contained in this document, please contact Trish Adams at 772-562-3909, extension 232.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:
CPE, Boca Raton, Florida (Craig Krumple)
DEP, Bureau of Beaches and Coastal Systems, Tallahassee, Florida (Roxanne Dow)
EPA, West Palm Beach, Florida
FWC, Bureau of Protected Species Management, Tallahassee, Florida (Robbin Trindell)
NOAA Fisheries, St. Petersburg, Florida
Service, Jacksonville, Florida (Sandy MacPherson)

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